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ABSTRACT

The individual stylistic variations of creative potential and conceptual tempo were investigated in 61 preschool children. The Kansas Reflection Impulsivity Scale for Preschoolers (KRISP) was used to measure the reflective/impulsive (that is, creative tempo) dimension, and the Multidimensional Stimulus Fluency Measure (MSFM) was administered to determine ideational fluency (creative potential). Children were classified as reflective (slow/accurate) or impulsive (fast/inaccurate), as well as fast/accurate and slow/inaccurate. No differences were found between reflectives and impulsives on the ideational fluency measure. However, greater originality scores were evidenced in the fast/accurate and slow/inaccurate groups than among the reflectives and impulsives. Speculations and implications of this unusual finding were discussed in terms of the manner in which children may approach convergent and divergent tasks. (PCB)

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CREATIVE POTENTIAL AND CONCEPTUAL TEMPO IN PRESCHOOL CHILDREN

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Abstract

The individual stylistic variations of creative potential and conceptual tempo were investigated in preschool children. The age-appropriate measure used for the reflective/impulsive dimension was the Kansas Reflection Impulsivity Scale for Preschoolers (KRISP), and the Multidimensional Stimulus Fluency Measure (MSFM) addressed ideational fluency, i.e. creative potential. Of the 31 boys and 30 girls (mean age = 56.9 months), who were given these measures, 15 were classified as impulsive (fast, inaccurate) and 21 as reflective (slow, accurate), via median spilts on the error and latency scores of the KRISP. This study also included the 14 children who were classified as fast, accurate and the 11 slow, inaccurate children in the analysis. Contrary to expectations, no differences between reflectives and impulsives were found on the ideational fluency measure. However, analysis of all four quadrants of the conceptual tempo dimensions revealed an intereaction of KRISP latency and error scores, $F(1,57) = 12.78$, $p<.001$, with greater originality scores evidenced in the fast/accurate ($M = 20.38$) and slow/inaccurate ($M = 25.00$) groups then among the reflectives, i.e. slow/accurates ($M = 12.71$), and impulsives, i.e. fast/inaccurates ($M = 11.56$). Speculations and implications of this unusual finding were discussed in terms of the manner in which children may approach convergent and divergent tasks.

Creative Potential and Conceptual Tempo in Preschool Children

The past two decades have seen an abundance of interest in individual variation of cognitive processes in childhood and adolescence (Kogan, 1983). Kogan (1983) indicated the four areas of interest when considering cognitive stylistic variation are: metaphor, field dependence-independence, creativity, and reflection-impulsivity (i.e. conceptual tempo). These latter two individual variations provide the basis for this study.

Kagan (1965) identified a reflective/impulsive continuum, with reflectives being slow to reach decisions and impulsive responding quickly. Kagan, Rosman, Day, Albert, and Phillips (1964) developed a test for conceptual tempo called the Matching Familiar Figures Test (MFF) which has become the primary index for identification of conceptual tempo. In the past, the MFF identified reflective or impulsive children by looking at their response latencies and error scores while using a median split. The slow but accurate children were classified as reflective, and impulsives were fast, innaccurate children. Critics of the MFF have argued that the process of median splits of both latency and error scores caused two different constructs to be integrated. Several children (the slow

inaccurate and the fast accurate) were being ignored (Block, Block & Harrington, 1974). It was suggested that the refective/impulsive dimensions be considered as continuous variables rather than using the median-split technique (Ault, Mitchell, & Harmann, 1976). The reliability of the MFF with the preschool age child has also been questioned (Wright, 1971). Wright (1971) developed a measure similar to the MFF but applicable to preschoolers, called the Kansas Reflective-Impulsivity Scale for Preschoolers (KRISP).

While considering creativity within the Guilford (1956) framework, Mednick (1962) proposed that the quantity of ideational output is related to its quality, and that a response hierachy exists such that popular responses generally appear early in the sequence and original responses later. White (1965) also proposed an order effect of responding with his theory of "temporal stacking" by stating that "different responses become maximally 'ready' in different time zones after the stimulus has initiated the hunt for a response" (p. 189). It is a subject's response tempo or ability to inhibit initial responses which help to determine the selection of the possible responses available. The tempo of responding or conceptual tempo could conceivably affect quality and quantity of responses according to response hierarchy theories.

Only a few researchers (Fuqua, Bartsch, & Phye, 1975; Rosenfield, Houtz, & Steffero, 1977; Ward, 1968) have investigated the interrelationship of the latter two of

these cognitive processes (creativity and conceptual tempo). All of these researchers have approached their quest for a relationship between conceptual tempo and creativity with the prediction that impulsive children, because of their nonconformity, and uninhibited, free-wheeling response style, would perform better on creativity measures. However, Fuqua et. al. (1975) found that reflectives were more creative, while Ward (1968) and Rosenfield et. al. (1977) reported no relationship between conceptual tempo and creativity.

Fuqua et. al. (1975) suggested that creativity might emphasize deliberate and systematic exploration thereby accounting for the higher scores of the reflective children on measures of creativity. Validity of these findings, however, could be challenged because the measures used may have been inappropriate for the preschool-age child. These researchers used the MFF rather than the KRISP and they used the Picture Completion task from the Torrance Tests of Creative Thinking, which is designed and normed for older children. Additionally, they looked at only the impulsive and reflective children and did not consider the groups of fast accurate and slow inaccurate children.

Using the Guilford-Mednick conceptualization of creativity, the present research investigated the pattern of original responses given by reflective and impulsive preschool children on age appropriate measures of ideational fluency. It was hypothesized that reflective children would

produce more original responses on ideational fluency measures than impulsive children, i.e. reflectives would begin further down on the response hierarchy and thus give more unusual responses early in the response sequence and greater number of total original responses than impulsive children. Since errors on the MFF have been found to be related to task persistence (Carey, Fox & McDevitt, 1977), we also expected inaccurate children to prematurely truncate the response hierarchy resulting in fewer responses overall. While primarily viewing the originality scores of reflective and impulsive children, the fast accurate and slow inaccurate subjects were also considered.

Methods

Subjects

The sample consisted of 31 boys and 30 girls, who were between the ages of 45-72 months (mean age = 56.9 months, s.d.= 7.48). These children were enrolled in a University Laboratory School and the group was 7% nonwhite and of above average IQ (mean IQ = 115).

Instruments Used as Predictors

Ideational Fluency. The Multi-dimensional Stimulus Fluency Measure (MSFM), (Moran, Milgram, Sawyers, & Fu, 1983) for ideational fluency was used. This test consists of three measures (instances, pattern meanings, and alternate uses) with two items per measure. Moran, Sawyers, Fu and

Milgram, (1984) found that this measure is a valid predictor of original thinking in that it correlates to measures of fantasy (r = .40, $p<.05$) and imaginative play (r = .59, $p<.05$). Moreover the reliability of the MSFM has been established with scores being relatively stable over a two year period (Moore & Sawyers, in press). Each test response was scored as popular or original, i.e., given by more or less than five percent of the normative group, respectively. The time until first response and the overall time in task and the responding time (from first to last response) were also recorded.

Conceptual Tempo. Form A of the KRISP test (Wright, 1971) for reflective-impulsivity was used. This is a matching-to- standard task involving 5 pretest items and 10 test items. Response latency from presentation until first response and numbers of errors were recorded.

Procedure. Testing continued over a five week period with each subject tested individually for two sessions in a private room separate from the other children and relatively free from external stimuli. Trained examiners conducted the sessions which were approached from a game-like perspective. In session one, instances and pattern meanings measures were given; and in the second session the alternate uses and the KRISP measures were administered. The two, 10 to 15 minute testing sessions, were approximately two weeks apart with no time limits for responding given. Different examiners were used in each of the two sessions. All ideational fluency

measures were tape recorded in order to record the time to first response and overall time in task. The timing of the KRISP was recorded by means of a stopwatch.

Results

A latency median split of 5.35 seconds along with an error median split of 3.60 allowed 36 of the 61 subjects (59%) to be classified as impulsive or reflective (15 impulsive, 21 reflective, 11 slow inaccurate and 14 fast accurate subjects)[1] . Each of the four quadrants of the conceptual tempo continuum were analyzed, yet primary analyses focused on the differences in the impulsive and reflective groups. A two-tailed t-test revealed no significant difference for reflectives and impulsives on total originality scores on the MSFM.

Insert Table 1 about here

No difference for their total popular score, time to first response or total time for the ideational fluency tasks was evidenced for these two groups. Pearson Product Moment Correlations revealed no significant correlations between either error and latency with total original scores. The time in task and latency to first response taken during the administration of the MSFM did not correlate with the latency or the error scores of the KRISP.

Insert Table 2 about here

Additional analysis between all four quandrants defined in the reflective-impulsive dimension revealed an interesting and rather puzzling interaction between errors and latency: the slow inaccurate (S/I) and the fast accurate (F/A) groups scored significantly higher on originality than the slow accurate (reflective) and the fast inaccurate (impulsive) groups, F (1,57) = 12.78, p <.001. This interaction also held true for total time in the MSFM task, with significantly greater time in task for the S/I and F/A groups than for the reflective and impulsive groups F(1,57) = 9.44, p <.003.

Discussion

The findings clearly demonstrate the need to attend to all four quadrants of the conceptual tempo dimension and demand explanation in two areas: (a) the lack of relationship between originality and reflection-impulsivity and (b) the interaction between KRISP errors and latency, resulting in higher originality scores and longer time in task on the MSFM for the slow inaccurate and fast accurate groups. The lack of relationship between the conceptual tempo dimension of reflection-impulsivity and creativity confirms the findings of Rosenfield, Houtz, and Steffero (1977) from research with 5th grade children, and Ward

(1968) while studying preschool children, although disagrees with those of Fuqua et. al. (1975).

Kagan and Kogan (1970) warn against overgeneralization of MFF results to other tests and tasks, thus Rosenfield et. al. (1977) suggest that conceptual tempo measures should not be related to creativity or other problem solving tasks. Kagan and Messer (1975) suggest that with preschool age children conceptual tempo does not seem to have the same relationship to other variables as some research has revealed for school age children. However, this does not explain the relationship that Fuqua et. al. (1975) found between reflectivity and creativity. While studying preschool age children Fuqua and his associates used creativity scores from the Picture Completion subtest of the Torrance Test of Creative Thinking (TTCT), which has been suggested to show a correlation to convergent-thinking and general intelligence (Wallach, 1970) and which requires only a single response per stimulus item. The concept of reflectivity defines a person who is slow responding and low-error in the context of response uncertainty. The low error rate of the reflectives (perhaps related to method of approach to single response items) may account for the success of this group found in this particular Torrance Test, but not in the more divergent ideational fluency tasks used in the present study, as well as by Rosenfield, et. al. (1977) and Ward (1968).

The present study does suggest that those individuals with the greatest total original responses also have longer task persistence or willingness to stay with the task. However, there was no correlation between latency to first response on the ideational fluency measure and total originality scores. Thus highly creative individuals did not necessarily respond more slowly on their first response. Ward (1969) found that children who eventually produce more ideas tended to produce them at a greater average rate throughout the task, which could explain why the children with high total originality scores did not also have a long latency to first response. This finding is in partial concurrence with Mednick's (1962) response hierarchy, giving a flat hierarchy for high creative subjects who respond slowly and steadily and emit more original responses and a steep hierarchy for low creative subjects who respond at a higher rate and emit fewer original and total responses. It may also reflect that children approach the two types of tasks differently.

Although no difference was found between reflectives and impulsives, the interaction between KRISP errors and latency on originality scores indicated the superiority of the S/I and the F/A groups on ideational fluency measures. These findings suggest that the reflective/ impulsive description is highly complex. Factors underlying response latencies and errors may be relatively independent and as has been suggested (Kagan & Messer, 1975), the

reflection-impulsivity dimension appears to be task specific. Moreover, the findings suggest that individual differences in how children approach the task may have important implications in determining response levels and that the measures of latency and errors are indicative of other variables affecting task performance. Although no definitive explanations are forthcoming from this data, it would appear that low originality response rates would come from children characterized by higher anxiety and/or a "right" answer orientation (i.e., slow accurates who approach the divergent task as if it was a convergent task), as well as from children who lack attention to detail and/or the motivation and task persistence to perform well (i.e., fast inaccurates).

Slow inaccurate children, although they may demonstrate some anxiety over error, may not have a desire to conform, allowing them to explore more ideas. They may not transfer their anxiety and style used with the single response tasks to divergent tasks or they may approach all tasks as if they were divergent in nature and thus not worry about the correctness of their answer. It should be noted that in this study, this group is largely composed of children of at least average ability on convergent tasks, (i.e., mean errors are considerably lower than the mean of KRISP norms). The slower latencies of the slow inaccurates suggest a relaxed attitude and a williness to continue in a task which

in creativity measures result in production of greater number of responses, as well as more original responses.

The fast accurate group (who are high on convergent ability based on their low error scores) has a rapid response style which would suggest non-censuring of responses. Ward (1968) suggests that creativity entails minimal censoring or evaluation of potential responses which leads to relatively quick responding. This style, combined with attention to detail and task persistence would promote high originality on ideational fluency tasks. The slow accurates, by comparison, provide deliberate responses and tend to experience more anxiety over error (Kogan, 1976). Their anxiety and desire to conform with correct responses when transferred to creativity measures could inhibit the quality and quantity of responses. The group of fast inaccurates (impulsives) are also non-anxious over errors, yet their rapid responding tempo implies a desire to complete the task quickly without deliberation leading them to truncate the task early, thus producing fewer responses.

The discrepencies between this study and the Fuqua et. al. (1975) study may be explained within this framwork. Since these researchers did not report data for each of the four quadrants, we can only make reference to the reflectives and impulsives. The Picture Completion task of the TTCT is distinctly different than the MSFM when considered in this context. The Fuqua et. al. (1975) study used the Picture Completion task which appears to be more

compatible with the response style of reflective children who, as we categorized them, approach a task from a more convergent orientation. This framework suggests that reflectives performed better than impulsives on the TTCT, not because they were reflective, but because the task was compatible with their style, which also happens to be the same style which leads them to be classified as reflective.

It appears necessary to consider both latency and errors of the KRISP as indications of underlying variables (e.g., anxiety, attention to detail, conformity) which may affect creative potential. The data suggest that there are some children who may approach any task as a convergent task (slow accurates), some who may approach all tasks as divergent tasks (slow inaccurates), some who respond quickly without attention to detail or adequate motivation (fast inaccurates), and some who are able to switch their response styles to fit the task at hand (fast accurates).

In summary, the theoretical development of the constructs of conceptual tempo and divergent or creative thinking has argued persuasively for a definite relationship between the two; however previous studies, which examined only the refective and impulsive children, resulted in differing conclusions. The present investigation with preschool children found no relationship between reflective and impulsive children on originality, yet when adding the other two quadrants of the reflection-impulsivity dimension, found the fast accurate and slow inaccurate children scoring

significantly higher on ideational fluency than either slow accurate (reflective) or fast inaccurate (impulsive) children. This unexpected finding is explained by postulating that children approach convergent (e.g., KRISP) and divergent (e.g., MSFM) tasks with specific response styles which may be advantageous or disadvantageous to the particular type of task. We would suggest further investigation in the areas of anxiety, conformity, attention to detail, motivation and task persistence of the children identified in the four quadrants of the conceptual tempo dimension in order to add further support to our conclusions.

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Footnote

[1] Since categories were generated by median splits these descriptions should be considered relative rather than absolute. This is especially true for error scores which in this sample are considerably lower ($\underline{M}$ = 3.56) than the norms for the KRISP ($\underline{M}$ = 5.31). Latency scores in seconds were comparable for this sample ($\underline{M}$ = 5.36) and the normative sample ($\underline{M}$ = 4.89).

Table 1

Means and Standard Deviations for the four KRISP Quadrants on KRISP and MSFM variables

Speed Accuracy		KRISP Quadrant[a] Slow Accurate	Fast Inaccurate	Fast Accurate	Slow Inaccurate
(n)		(21)	(15)	(14)	(11)
KRISP scores:					
Latency	M	6.56[b]	3.74	4.37	6.52
	SD	1.18	.83	.70	1.42
Errors	M	1.86	5.38	2.31	5.91
	SD	1.06	1.67	.86	2.07
MSFM scores:					
Total-Original	M	12.71	11.56	20.38	25.00
	SD	7.34	6.76	11.05	17.13
Total-Popular	M	14.29	12.88	19.31	17.09
	SD	4.34	6.41	9.89	4.83
Latency 1st Response	M	6.03[b]	5.69	5.27	6.15
	SD	3.28	3.76	1.15	4.83
Total time in Task	M	68.95[b]	50.80	101.40	96.25
	SD	34.54	30.65	59.27	47.16

Note. KRISP = Kansas Reflective Impulsivity Scale for Preschoolers

MSFM = Multidimensional Stimulus Fluency Measure

[a]Categories reflect median splits and thus descriptions of speed as "fast" or errors as "accurate" are relative rather than absolute.

[b]Time is recorded in seconds.

Table 2

Correlations between MSFM total scores and time measurements with KRISP error and latency scores

	MSFM Total Fluency	MSFM Latency 1st Response	MSFM Total Time	KRISP Latency	KRISP Errors
MSFM Total-Original	.93*	-.06	.83*	.08	.12
Total-Fluency		-.14	.88*	.04	.06
Latency to 1st Response			-.05	.17	-.02
Total Time				.11	-.07
KRISP Latency					-.25

*p < .001